Reconsiderando el rol de la ganadería en el Cambio Climático

Albrecht Glatzle

Estación Experimental Chaco Central

Abril 2017

Estación Experimental Chaco Central (MAG/GTZ)

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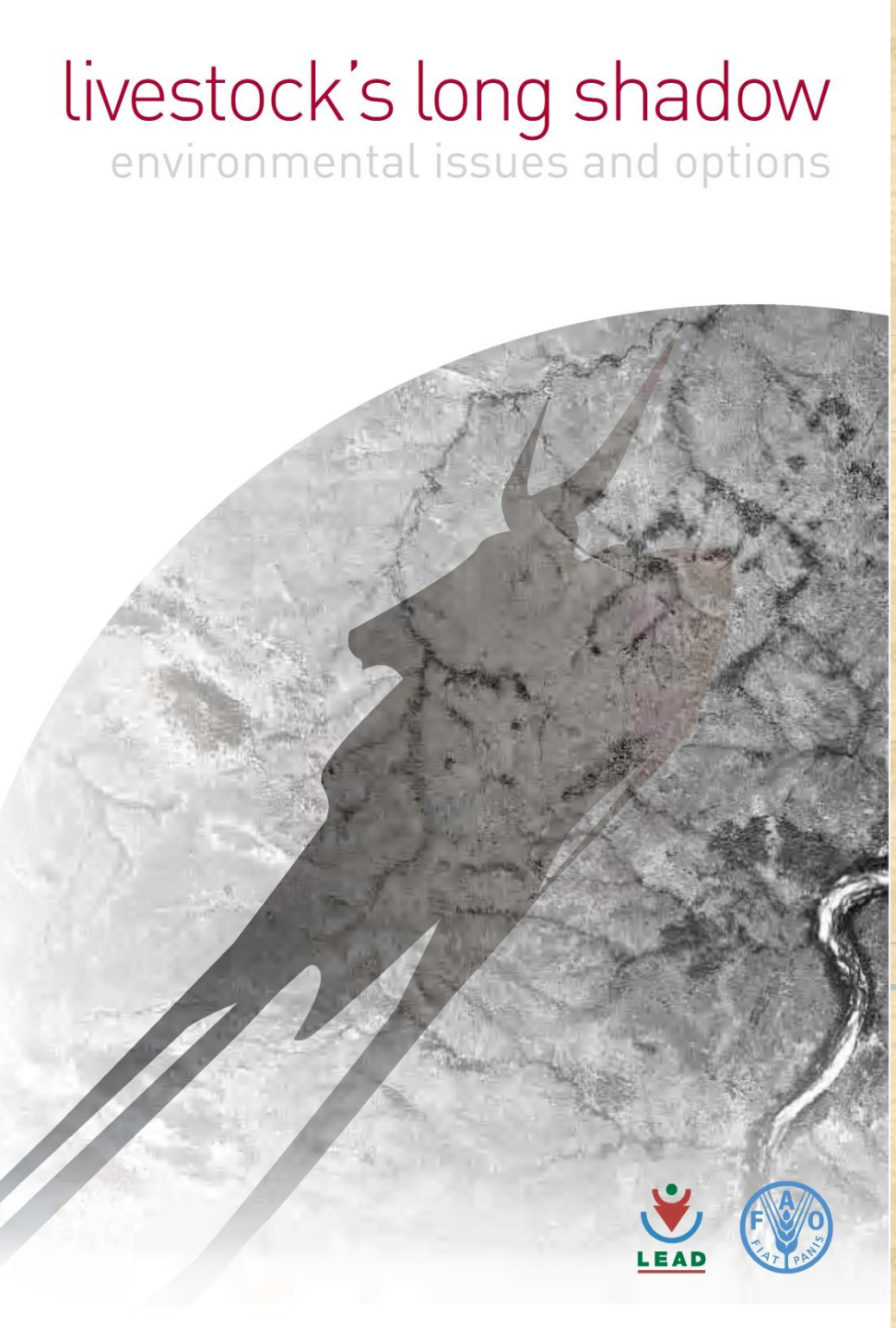

UN NEWS CENTRE UN News service

Rearing cattle produces more greenhouse gases than driving cars, UN report warns

SCIENTIFIC AMERICAN™

How Meat Contributes to Global Warming

LA CRÓNICA DE HOY

El ganado genera el 18% de gases de efecto invernadero, más que el transporte; recomiendan reducir el consumo de carne


EUROPEAN PARLIAMENT
PARLEMENT EUROPÉEN
PARLAMENTO EUROPEO
PARLAIMINT NA hEORPA
EUROPOS PARLAMENTAS
EURÓPAI PARLAMENT
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ARING ON GLOBAL WARMIN AND FOOD POLICY
Less Meat =
at
EUROPEAN PARLIAMENT
THURSDAY 3 DECEMBER 2009
Less Meat = Less Heat
HEARING ON
GLOBAL WARMING
AND FOOD POLICY
EUROPÄISCHES PARLAMENT
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HEAT

nature climate change

opinion & comment

Nature Climate Change **4**, 2–5 (2014) | doi:10.1038/nclimate2081
Published online 20 December 2013

COMMENTARY:

Ruminants, climate change and climate policy

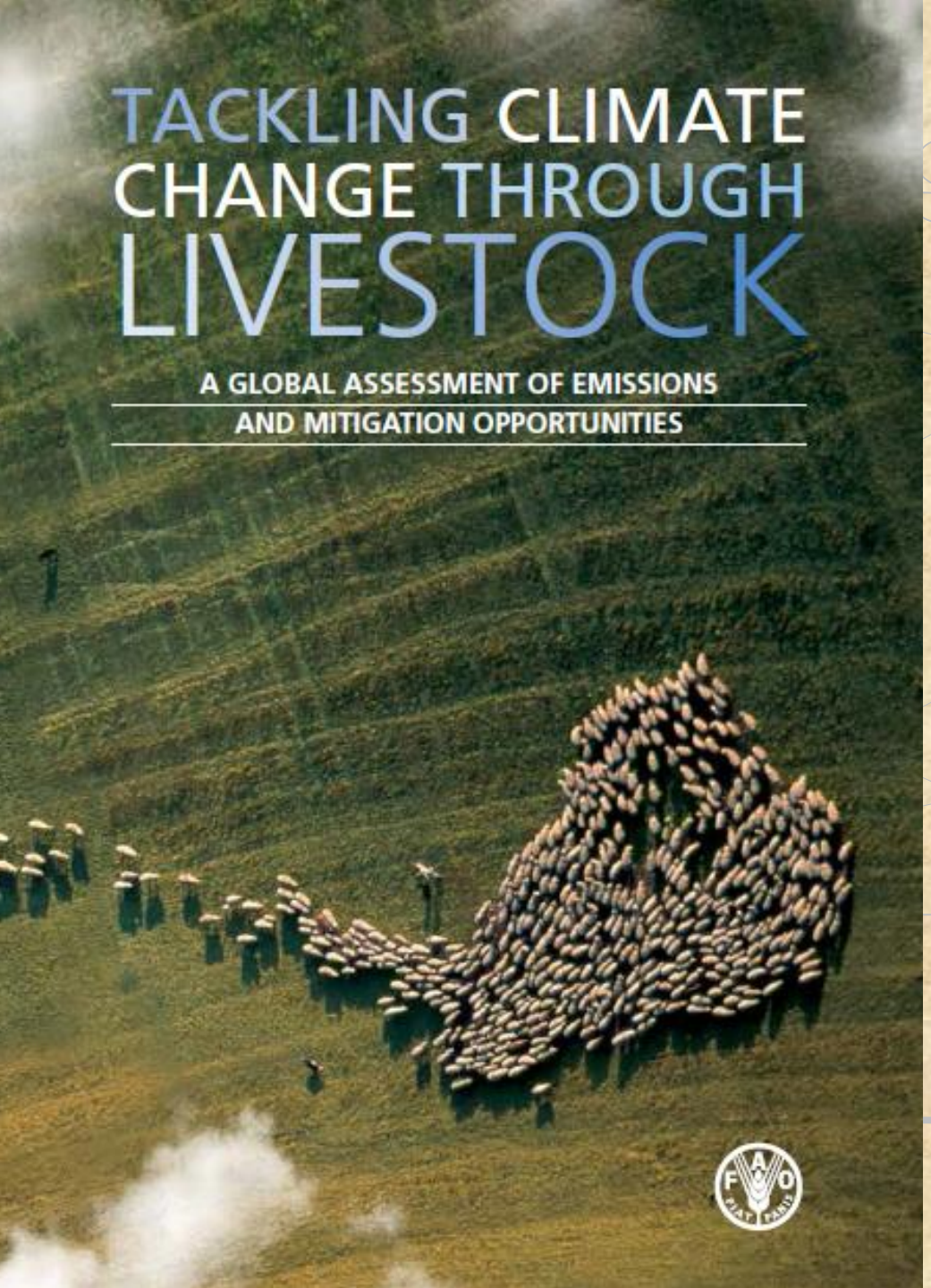
William J. Ripple, Pete Smith, Helmut Haberl, Stephen A. Montzka, Clive McAlpine and Douglas H. Boucher

Greenhouse gas emissions from ruminant meat production are significant. Reductions in global ruminant numbers could make a substantial contribution to climate change mitigation goals and yield important social and environmental co-benefits.

Although a main focus of climate policy has been to reduce fossil fuel consumption, large cuts in CO_2 emissions alone will not abate climate change. At present non-CO_2 greenhouse gases contribute about a third of total anthropogenic CO_2 equivalent (CO_2e) emissions and 35–45% of climate forcing (the change in radiant energy retained by

the process of enteric fermentation in a multichambered stomach. Methane is produced as a by-product of microbial digestive processes in the rumen. Non-ruminants or 'monogastric' animals such as pigs and poultry have a single-chambered stomach to digest food, and their methane emissions are negligible in comparison. There are no available

26% of the terrestrial surface of the planet[4]. Livestock production accounts for 70% of global agricultural land and the area dedicated to feed-crop production represents 33% of total arable land[4]. The feeding of crops to livestock is in direct competition with producing crops for human consumption (food security) and climate mitigation (bioenergy production or



Ganadería contribuye 14,5% a las emisiones antropogén. de GEIs.

41% proviene de beef

39% proviene de CH_4

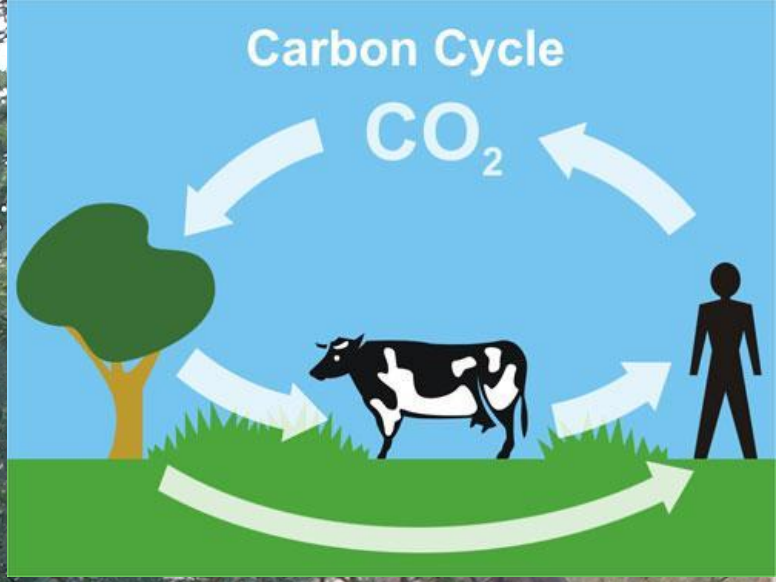
Intensidad de emisión promedio mundial beef:

68 kg CO_2-equ./kg res

Para Sudamérica:

100 kg CO_2-equ./kg res

- 40% deforestación
- 30% ferment. entérica
- 23% N_2O de heces


Carbon Cycle
CO_2

Fuentes adicionales de CO_2

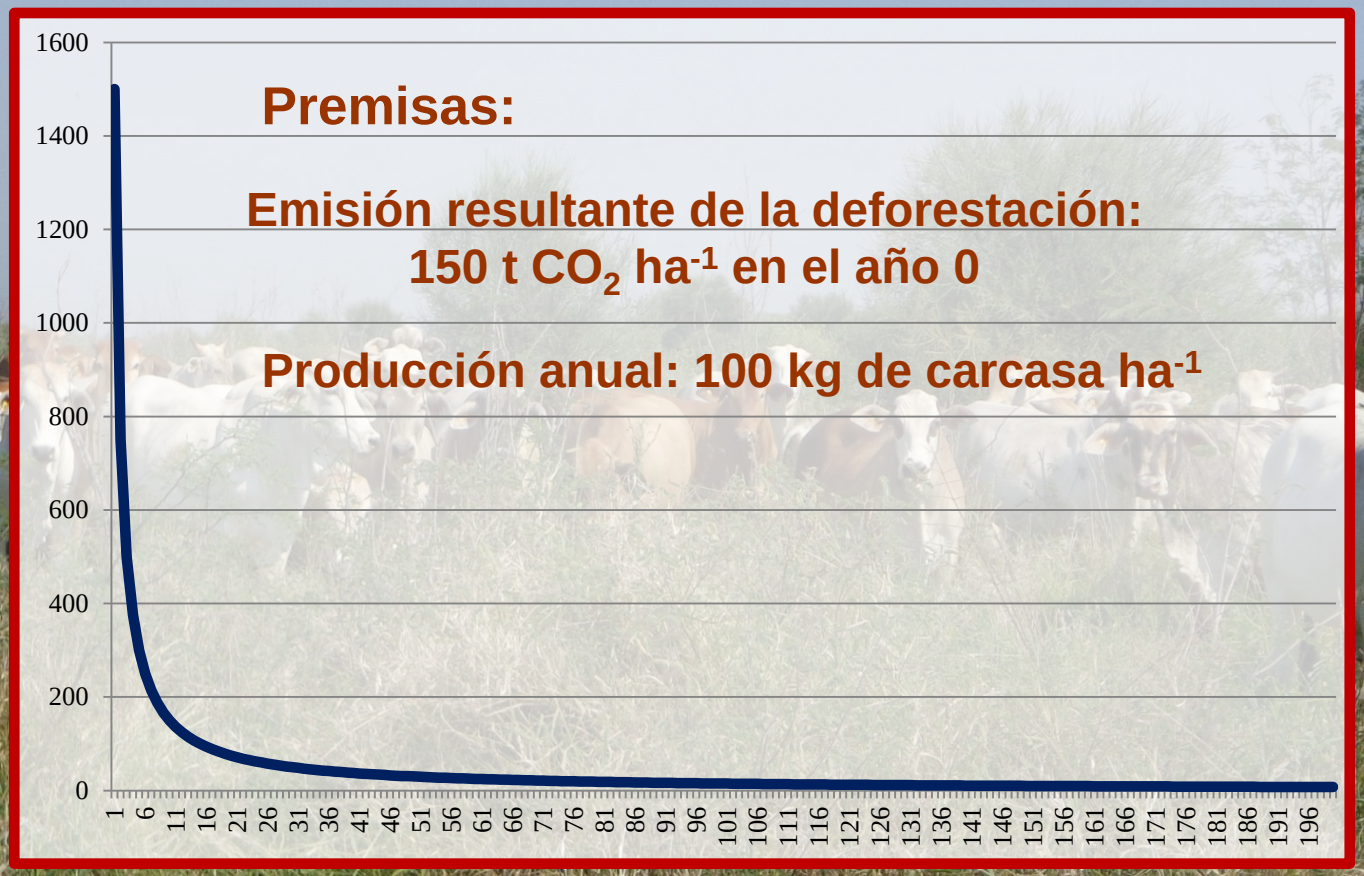
Intensidad de emisiones del pienso resultantes de combustibles fósiles

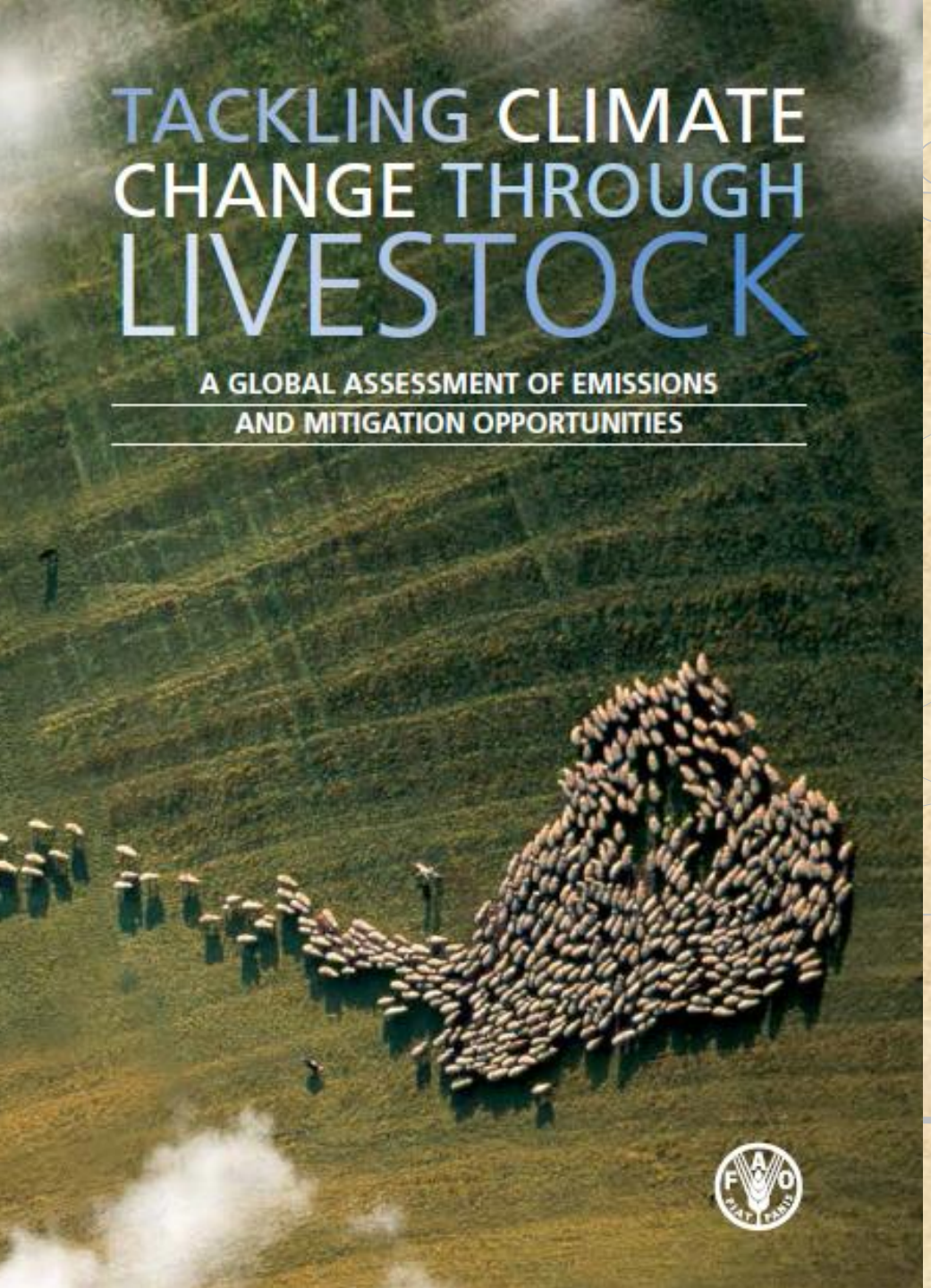
kg CO_2 kg^{-1} MS consumido (adaptado de Opio *et al.* 2013, Fig. 33)

< 0,05

≈ 0,3

Intensidad de la emisión resultante de la deforestación en función del tiempo de uso de la pastura que sustituyó al bosque





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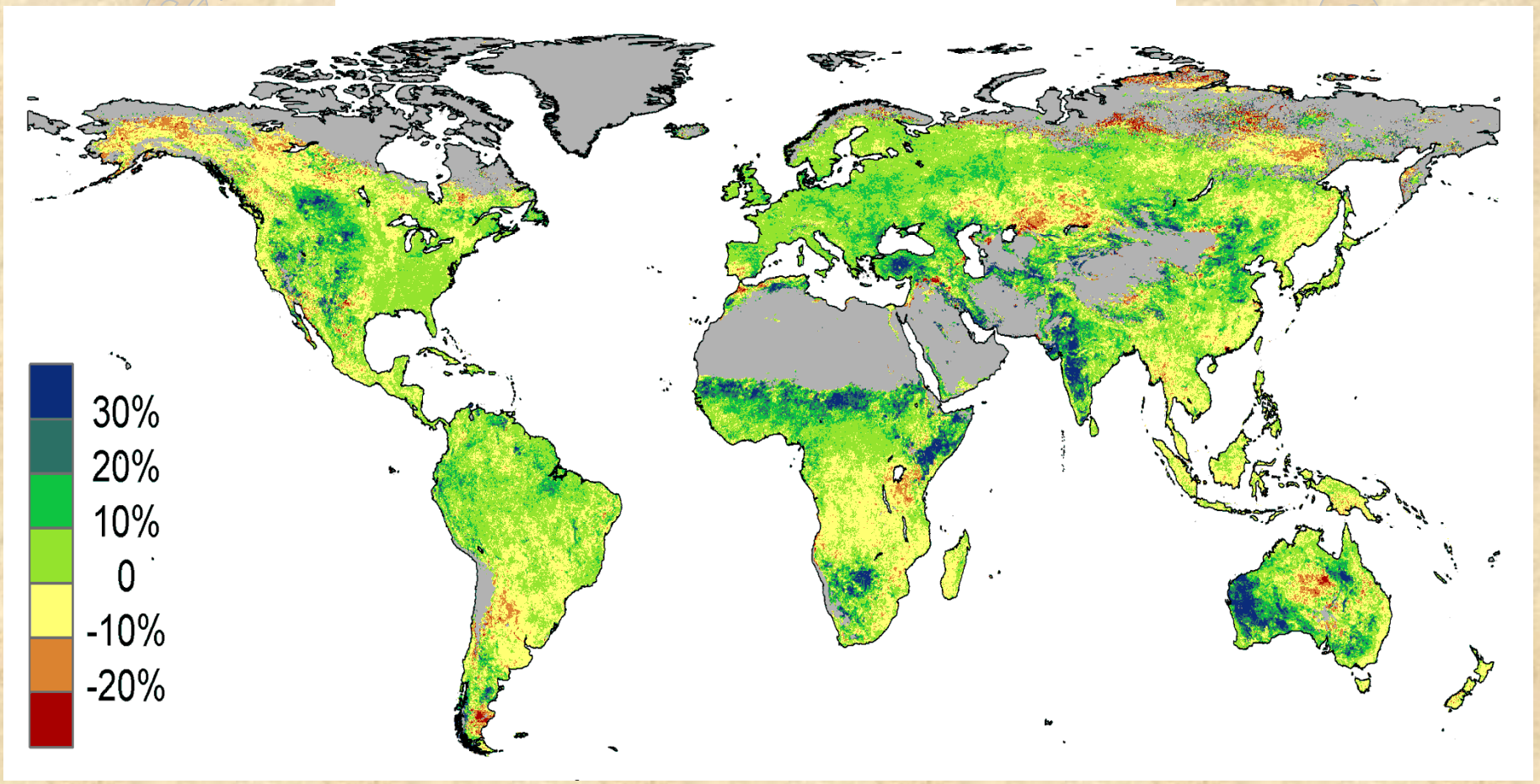
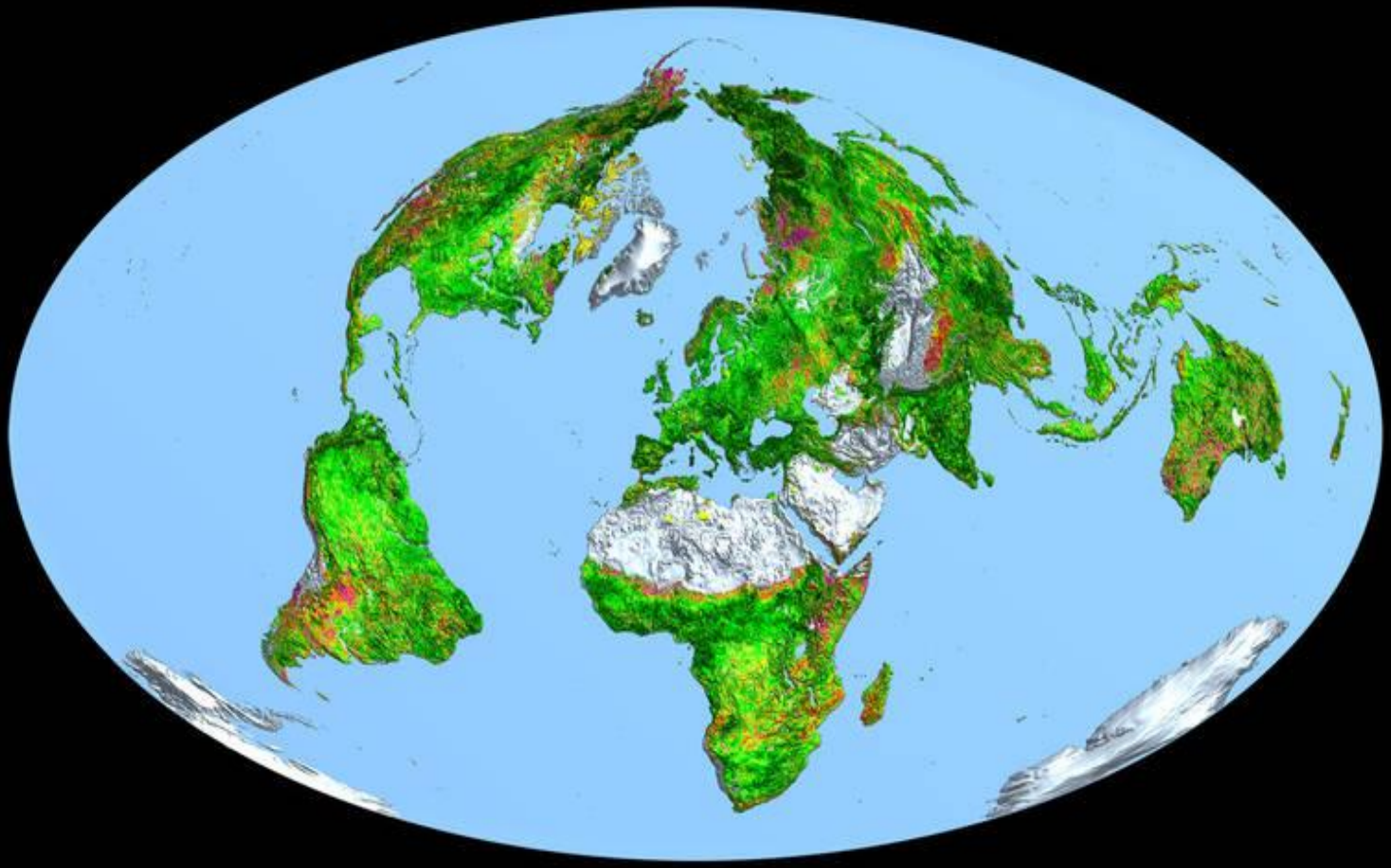
El mundo se puso más verde en los 30 años pasados debido a la fertilización con dióxido carbónico (CO_2).

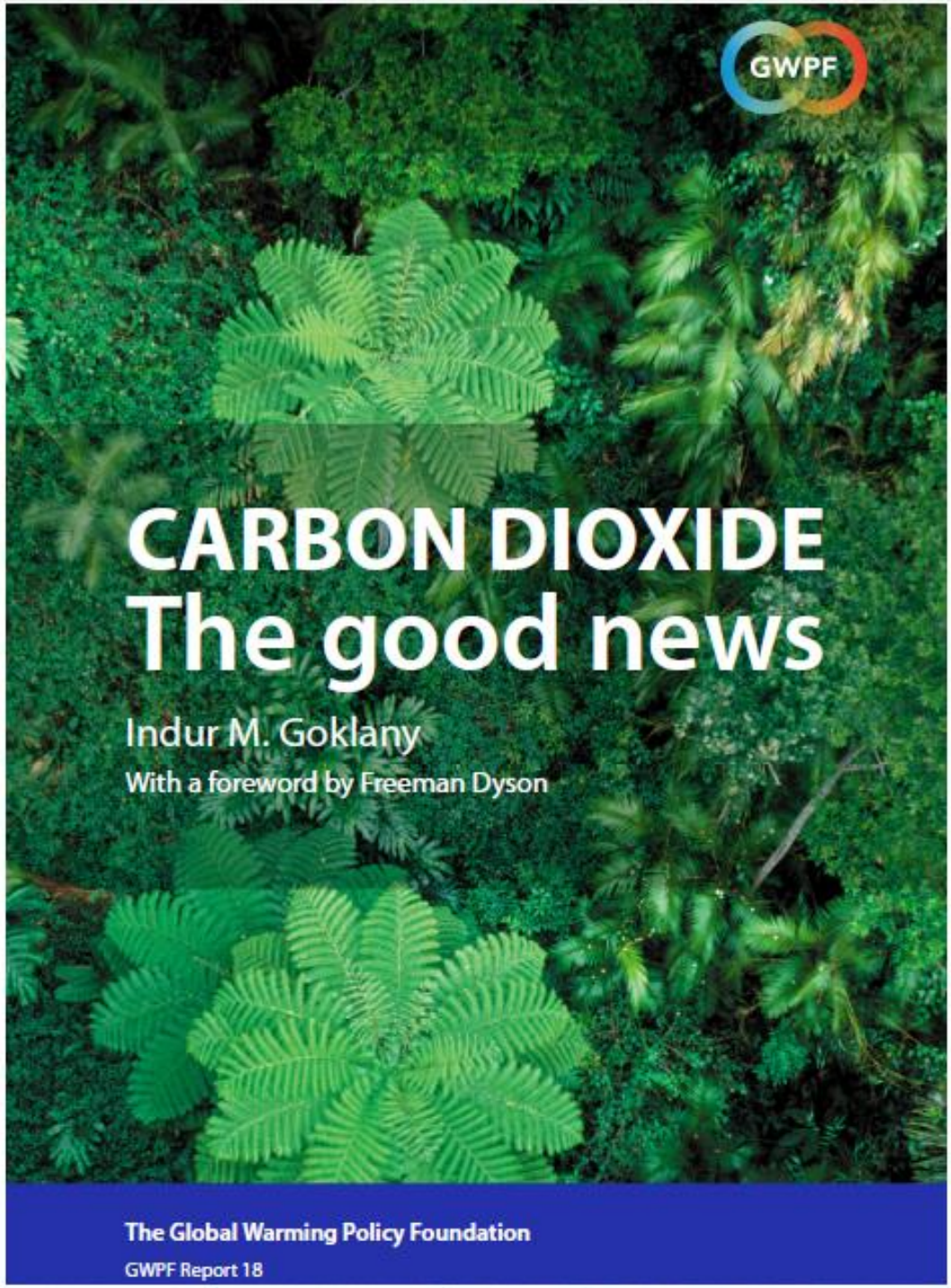
Fuente: CSIRO, 2013



April 26, 2016

Carbon Dioxide Fertilization Greening Earth, Study Finds





Valor fertilizador de dióxido carbónico (CO_2) antropogénico en la atmósfera:

140 mil millones US$/año

Goklany, Oct. 2015

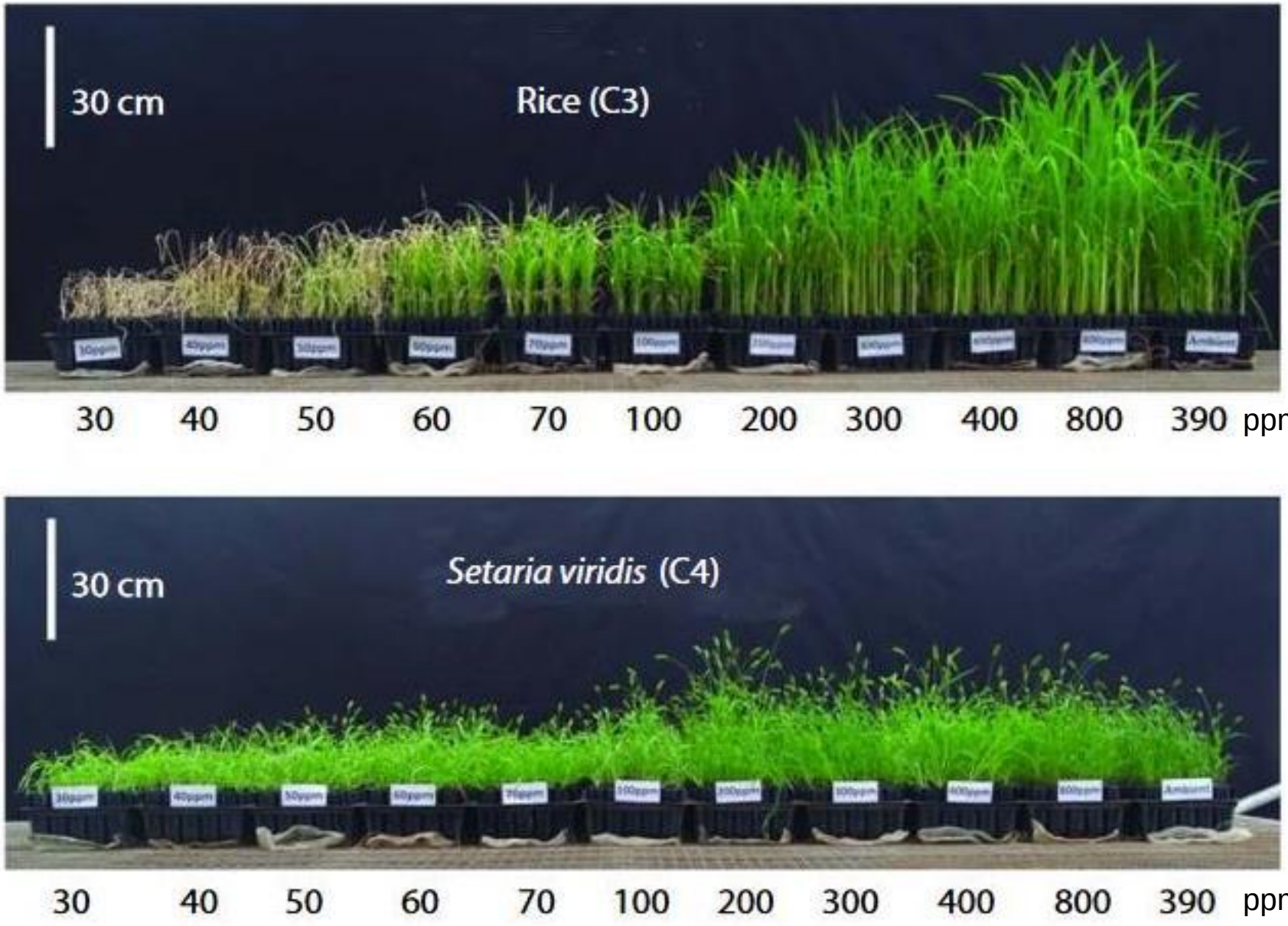
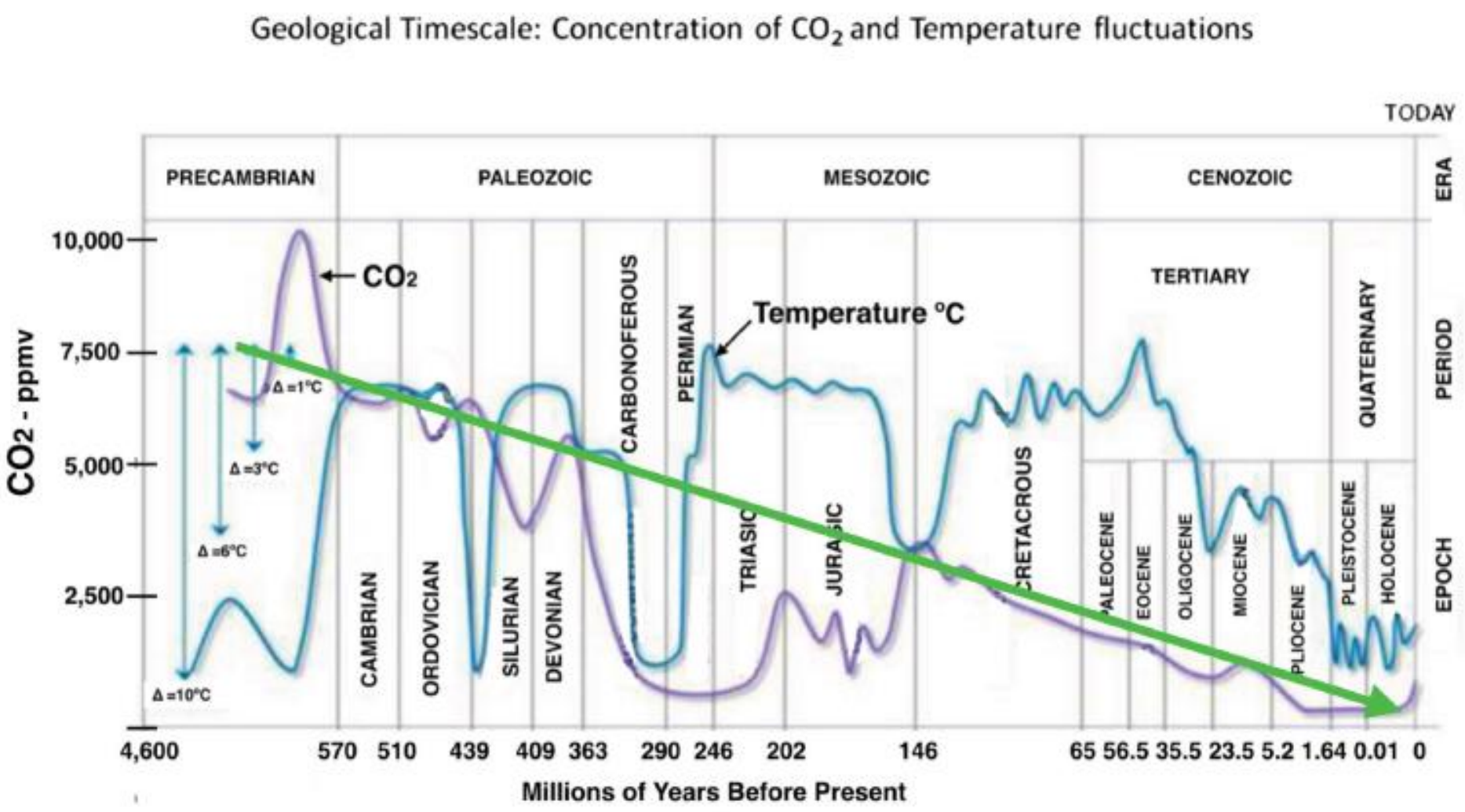


Figure 1: Carbon dioxide fertilisation of C3 crop and C4 weed

Source: von Caemmerer et al. (2012).

Fluctuaciones del dióxido de carbono (CO_2) y temperatura en escala geológica Fuente: Moore, 2016




CO_2

Metano (CH_4)

Fuentes:

Procesos anaeróbicos:

- fermentación entérica ruminal
- o en suelos anegados

Fuga desde depósitos fósiles

Sumideros naturales:

- bacterias metanotróficas
- Oxidación por radicales OH en el aire

Concentración atmosférica:

1,8 ppmv (0,00018 %)

< 2 moléculas en un millón

Óxido Nitroso (N_2O)

Fuentes:

Subproducto de la

- denitrificación anaeróbica y
- nitrificación aeróbica

Descomposición natural proporcionada por la radiación solar ultravioleta en la estratósfera

Concentración atmosférica:

< 0,35 ppmv (< 0,000035 %)

< 1 molécula en un millón

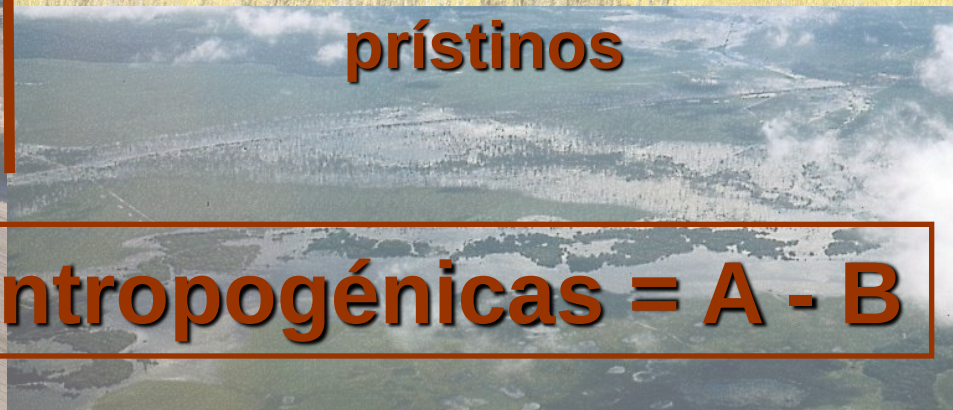
Emisión antropogénica de CH_4 y N_2O

Emisiones desde los ecosistemas gestionados = A

desde agro-ecosistemas de pre-cambio climático

Emisiones básicas = B

desde ecosistemas prístinos



Emisiones efectivas antropogénicas = A - B

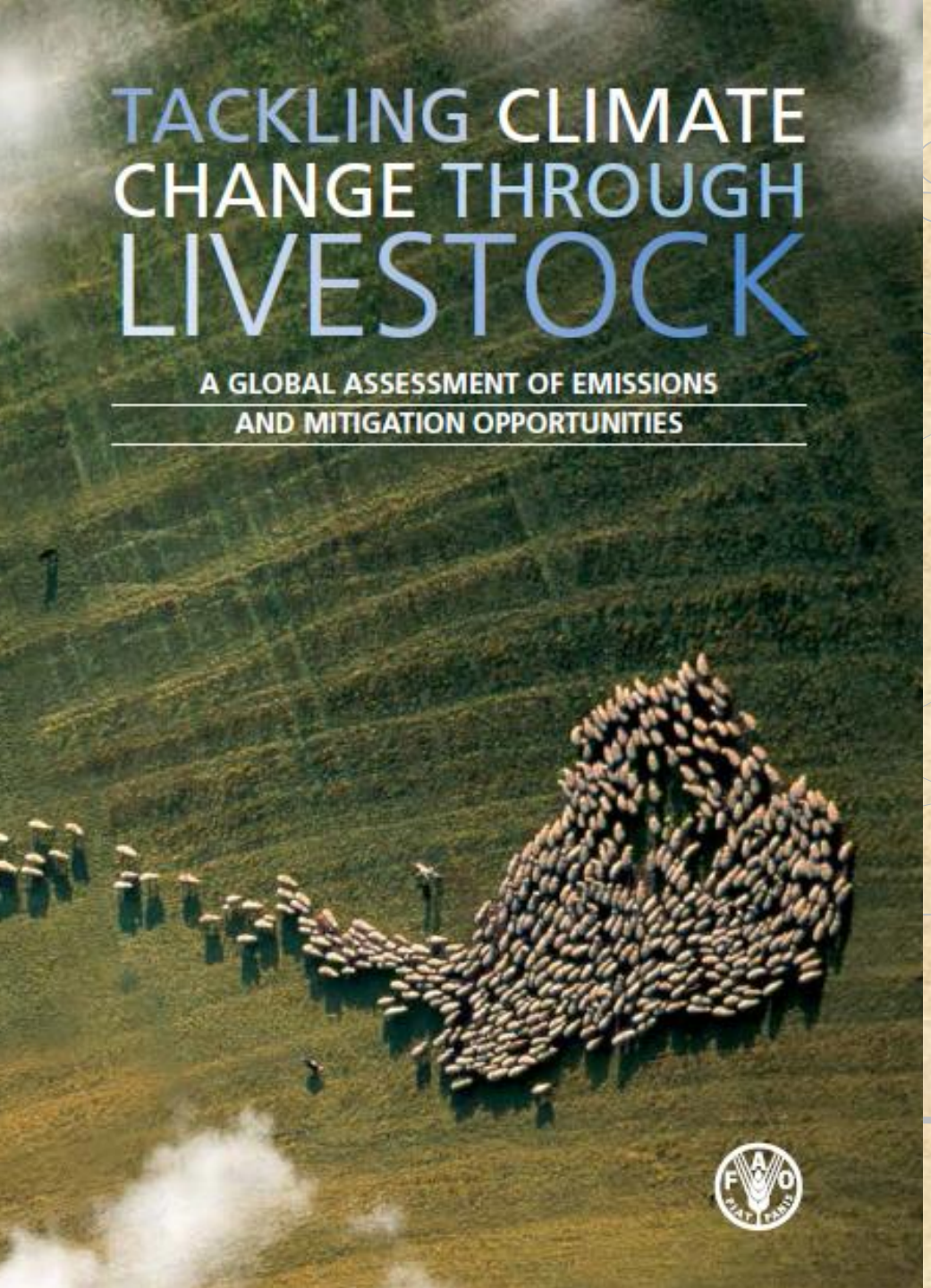
Parches de heces:

- concentración de Nitrógeno,
- factor de emisión para N_2O no sube,
- emisión de CH_4 durante una semana,
- después se pone en sumidero neto de CH_4 - igual como el resto de la pastura en promedio del año.

Fuente: Nichols *et al.*, 2016

Stock estimado de Nitrógeno en pastura y bosque (Chaco Paraguayo)

	Suelo	Biomasa
	kg N ha^{-1}	
Bosque	6500	450
Pastura	5500	250



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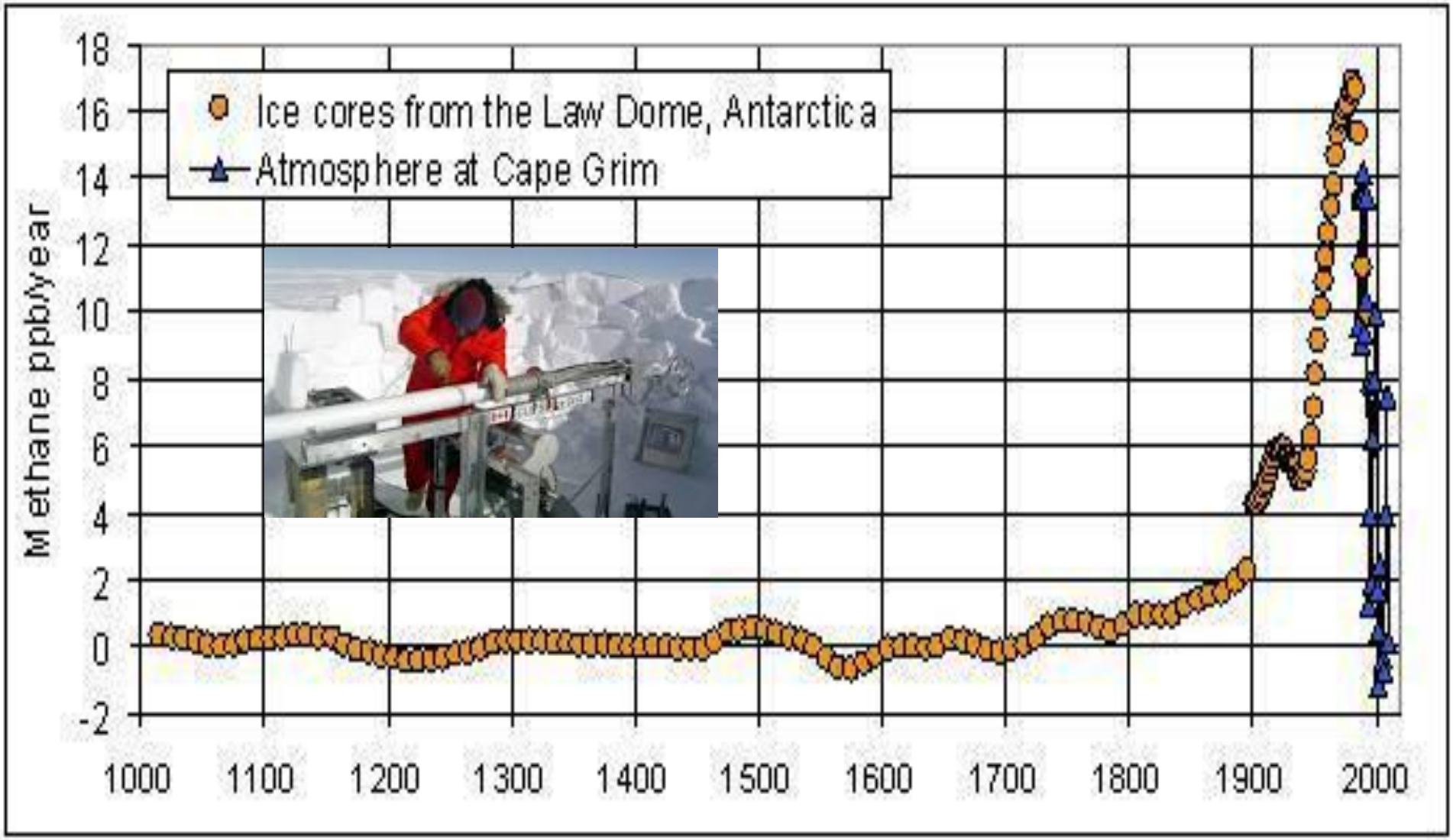
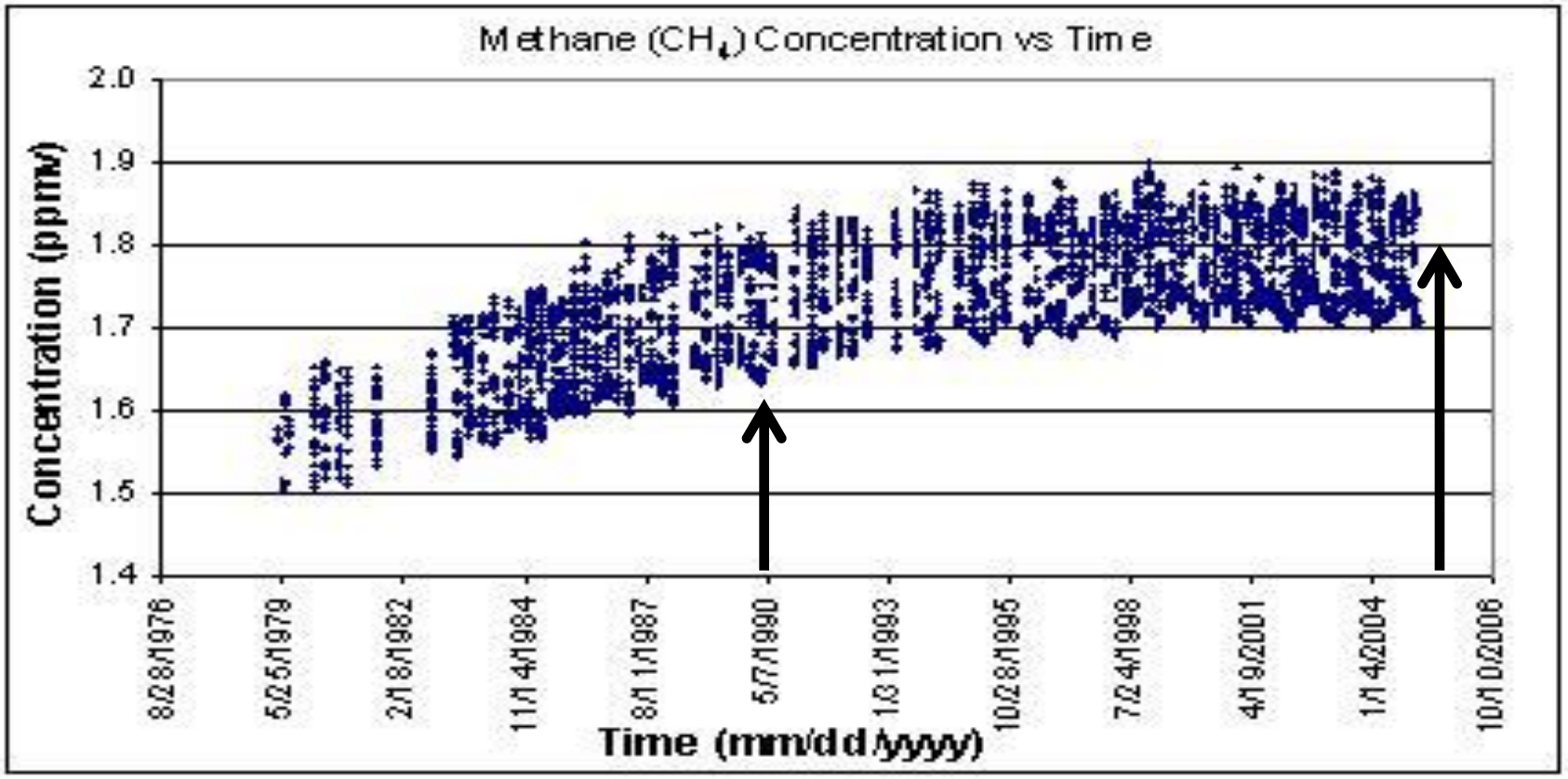
Cambio anual de la concentración de Metano en la atmósfera (Quirk, 2011)



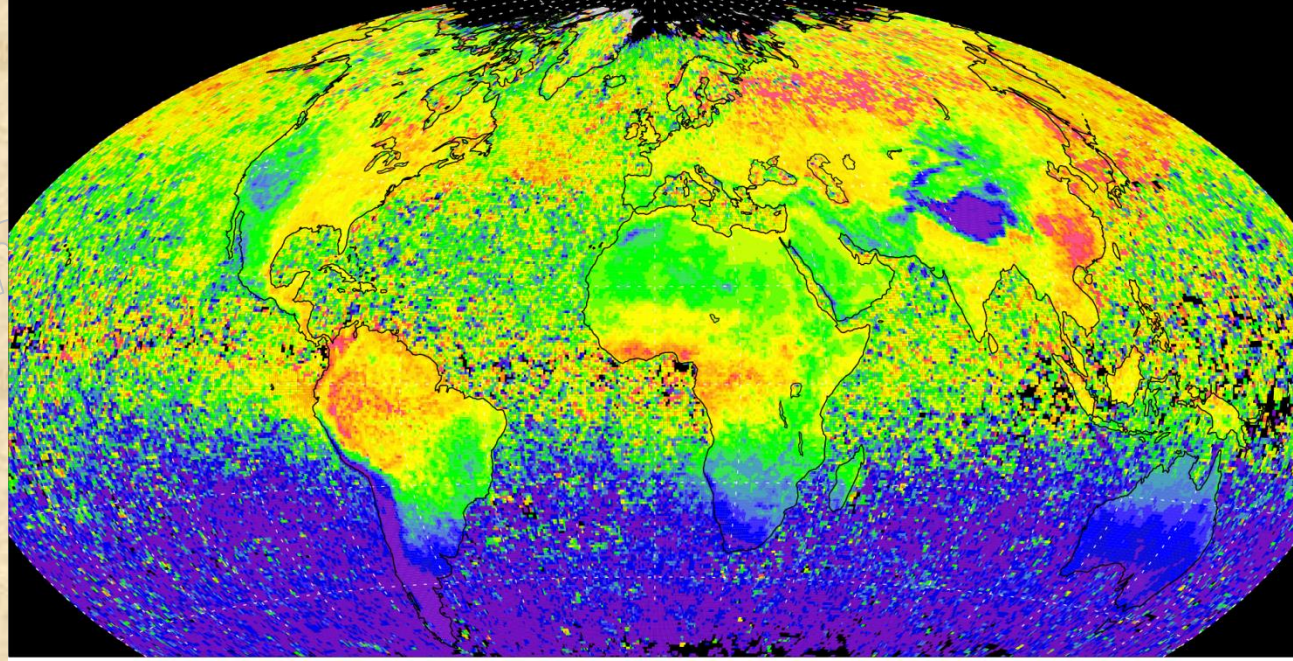
Concentración media global de Metano

(Borchert, 2008)

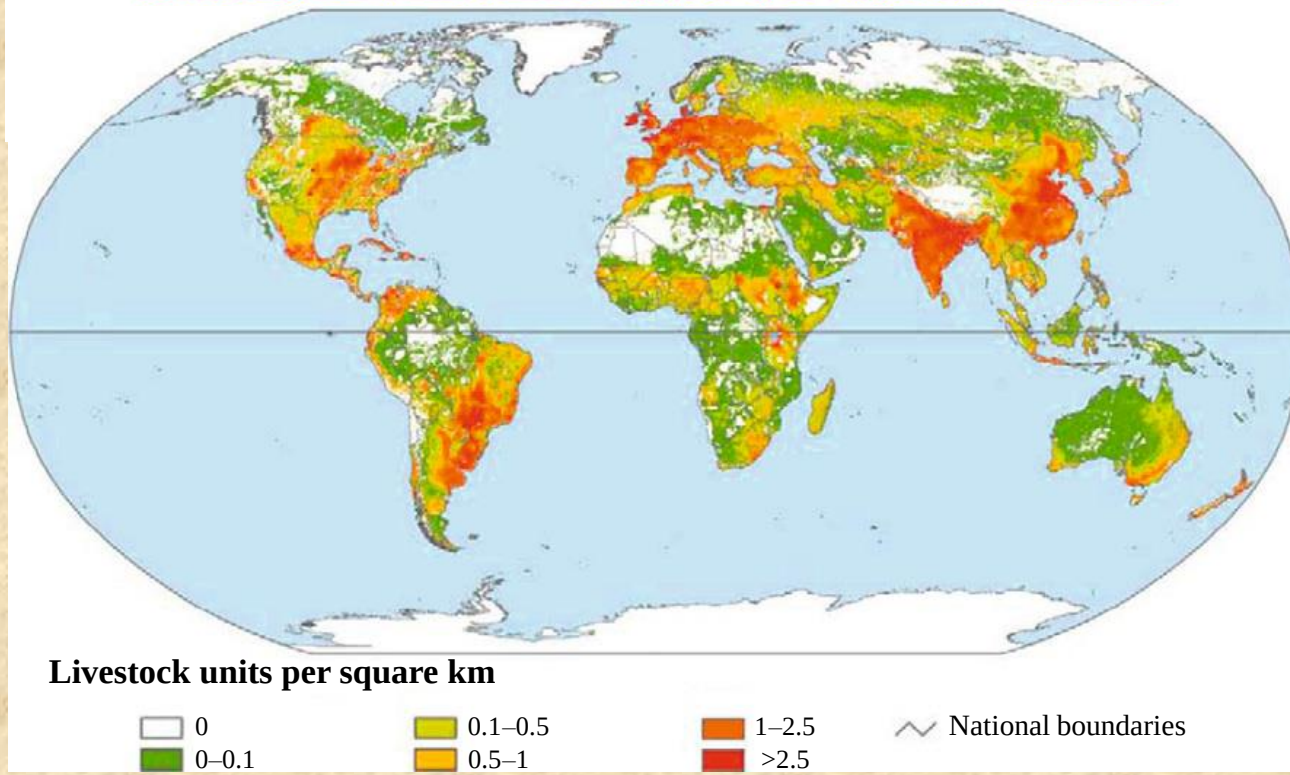
Methan



Distribución global de Metano (ENVISAT 2003-05)



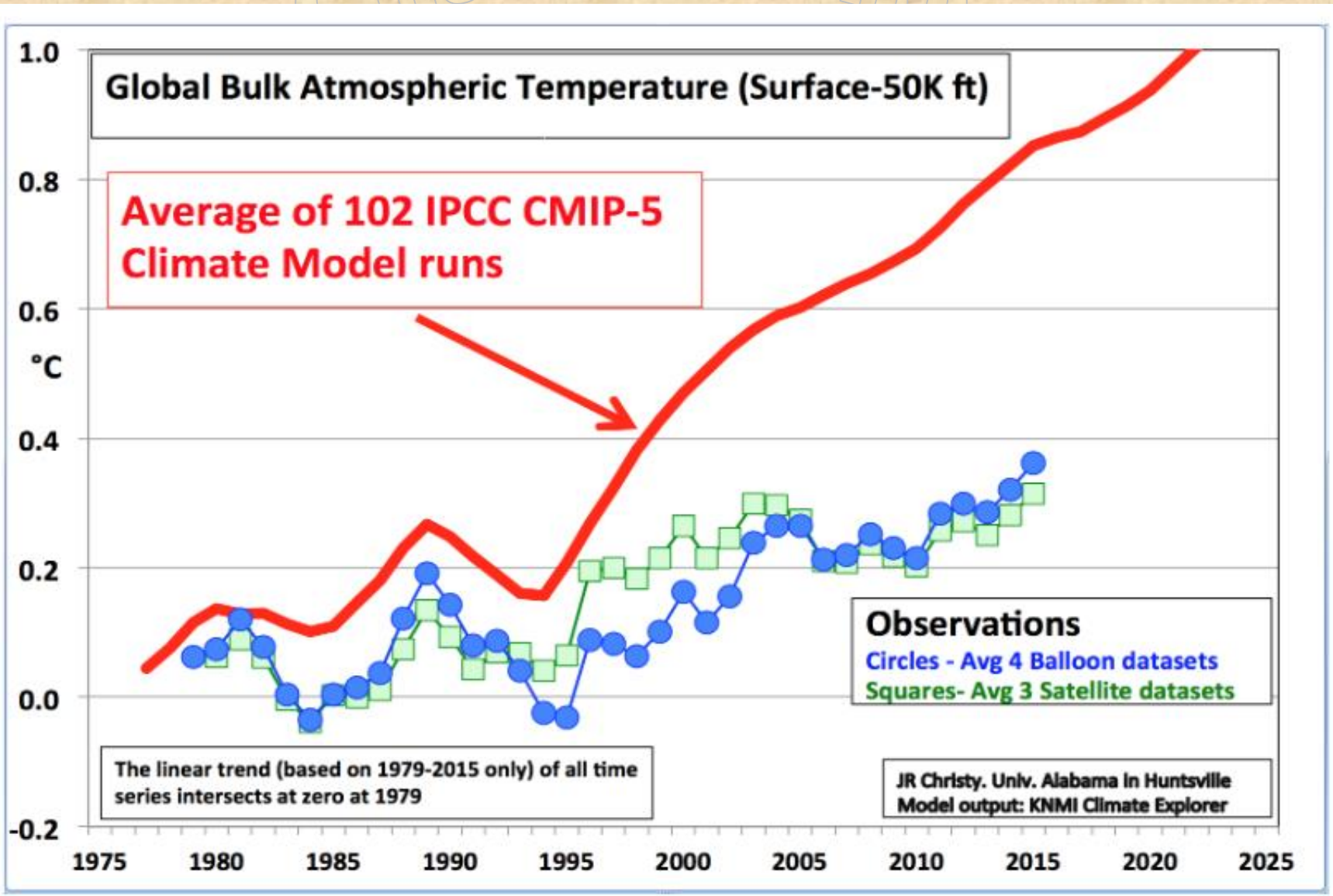
Distribución global de la densidad de animales domésticos (FAO, 2006)




12 09 2013


INTA

Variaciones de la temperatura de la tropósfera media global: Observaciones vs. modelos **(Christy, 2016)**



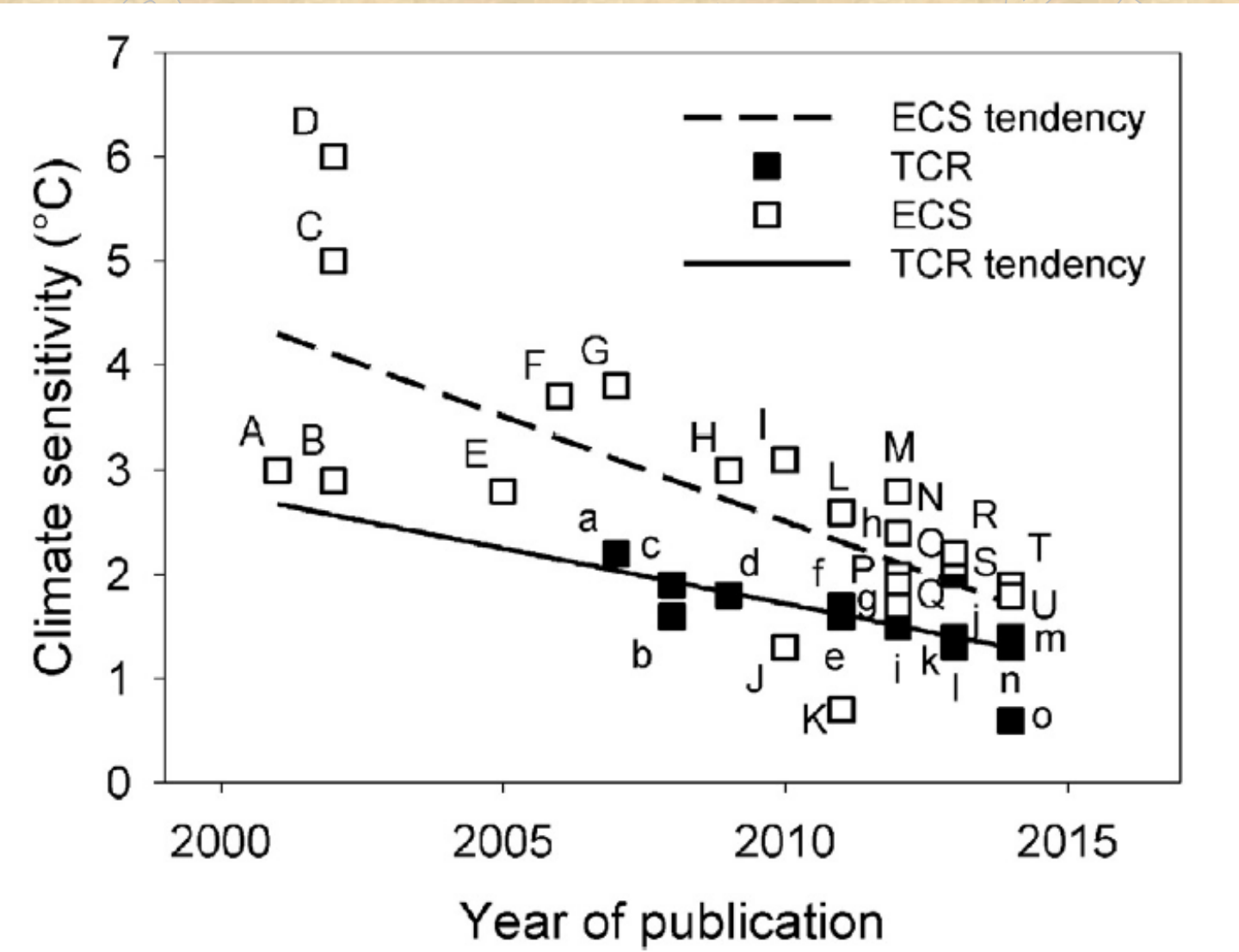
Evaluación del nivel de comprensión científica de las variables (forcing agents of global warming) usadas para la modelación

Tab. 2.11 en AR4 (IPCC, 2007)

LLGHGs	A	1	High	Past and present concentrations; spectroscopy	Pre-industrial concentrations of some species; vertical profile in stratosphere; spectroscopic strength of minor gases	Uncertainty assessment of measured trends from different observed data sets and differences between radiative transfer models
Stratospheric ozone	A	2	Medium	Measured trends and its vertical profile since 1980; cooling of stratosphere; spectroscopy	Changes prior to 1970; trends near tropopause; effect of recent trends	Range of model results weighted to calculations employing trustworthy observed ozone trend data
Tropospheric ozone	A	2	Medium	Present-day concentration at surface and some knowledge of vertical and spatial structure of concentrations and emissions; spectroscopy	Pre-industrial values and role of changes in lightning; vertical structure of trends near tropopause; aspects of emissions and chemistry	Range of published model results, upper bound increased to account for anthropogenic trend in lightning
Stratospheric water vapour from CH_4	A	3	Low	Global trends since 1990; CH_4 contribution to trend; spectroscopy	Global trends prior to 1990; [illegible] in climate models; CTM models of CH_4 oxidation	Range based on uncertainties in CH_4 contribution to trend and published RF estimates
Direct aerosol	A	2 to 3	Medium to Low	Ground-based and satellite measurements; some source region modelling	Emission estimates and their history; vertical structure of aerosol; optical properties; mixing; separation from natural background aerosol	Range of published model results with allowances made for comparisons with satellite data
Cloud albedo effect (all aerosols)	B	3	Low	Observed in case studies – e.g., ship tracks; GCMs model an effect	Lack of direct observational evidence of a global forcing	Range of published model results and published results where models have been constrained by satellite data
Surface albedo (land use)	A	2 to 3	Medium to Low	Some quantification of deforestation and desertification	Separation of anthropogenic changes from natural	Based on range of published estimates and published uncertainty analyses
Surface albedo (BC aerosol on snow)	B	3	Low	Estimates of BC aerosol on snow; some model studies suggest link	Separation of anthropogenic changes from natural; mixing of snow and BC aerosol; quantification of RF	Estimates based on a few published model studies
Persistent linear Contrails	A	3	Low	Cirrus radiative and microphysical properties; aviation emissions; contrail coverage in certain regions	Global contrail coverage and optical properties	Best estimate based on recent work and range from published model results
Solar irradiance	B	3	Low	Measurements over last 25 years; proxy indicators of solar activity	Relationship between proxy data and total solar irradiance; indirect ozone effects	Range from available reconstructions of solar irradiance and their qualitative assessment
Volcanic aerosol	A	3	Low	Observed aerosol changes from Mt. Pinatubo and El Chichón; proxy data for past eruptions; radiative effect of volcanic aerosol	Stratospheric aerosol concentrations from pre-1980 eruptions; atmospheric feedbacks	Past reconstructions/estimates of explosive volcances and observations of Mt. Pinatubo aerosol
Stratospheric water vapour from causes other than CH_4 oxidation	C	3	Very Low	Empirical and simple model studies suggest link; spectroscopy	Other causes of water vapour trends poorly understood	Not given
Tropospheric water vapour from irrigation	C	3	Very Low	Process understood; spectroscopy; some regional information	Global injection poorly quantified	Not given
Aviation-induced cirrus	C	3	Very Low	Cirrus radiative and microphysical properties; aviation emissions; contrail coverage in certain regions	Transformation of contrails to cirrus; aviation's effect on cirrus clouds	Not given
Cosmic rays	C	3	Very Low	Some empirical evidence and some observations as well as microphysical models suggest link to clouds	General lack/doubt regarding physical mechanism; dependence on correlation studies	Not given
Other surface effects	C	3	Very Low	Some model studies suggest link and some evidence of relevant processes	Quantification of RF and interpretation of results in forcing feedback context difficult	Not given

Nivel de comprensión

Estimaciones de la sensibilidad climática al CO_2 (aumento de temperatura con duplicación de CO_2) en la literatura científica en función del año de publicación (Gervais, 2016)



Temperaturas de verano y altitud de la línea de la arboleada en los Alpes desde el fin de la última glaciación, hace 12.000 años (Patzelt, 2014)

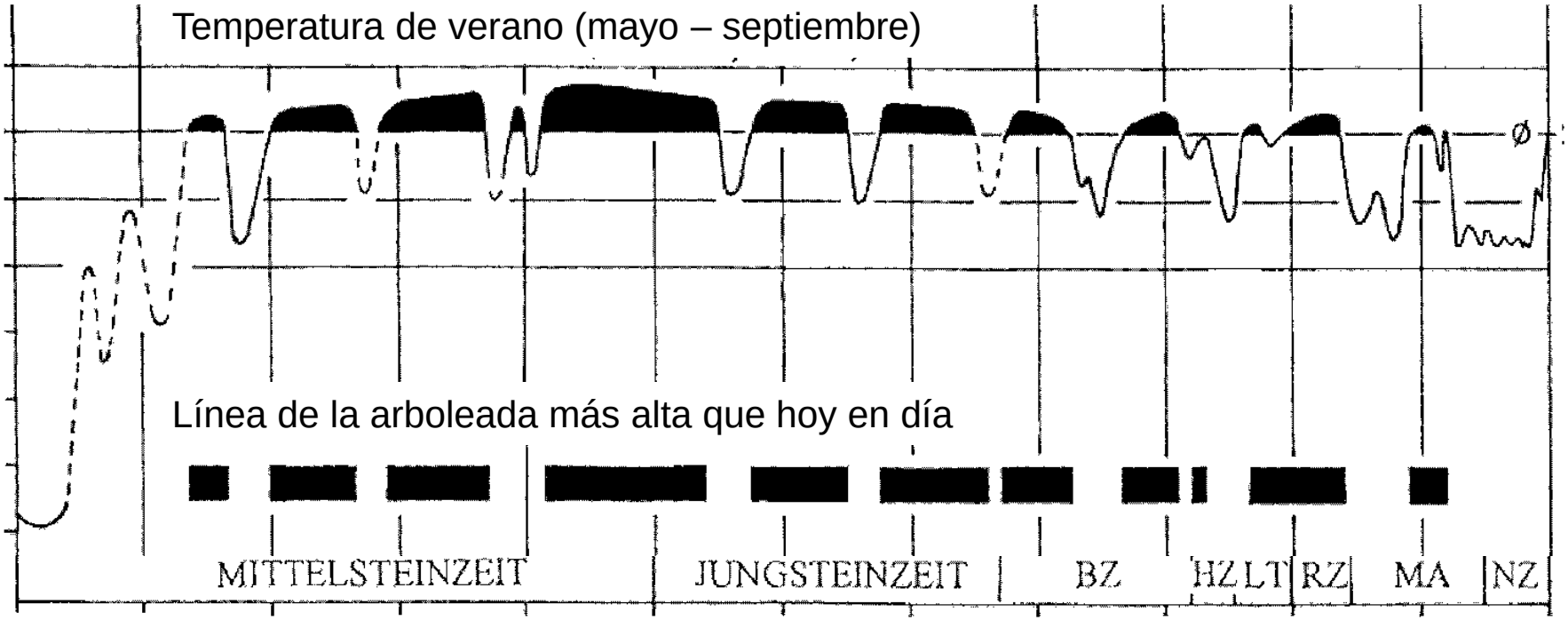


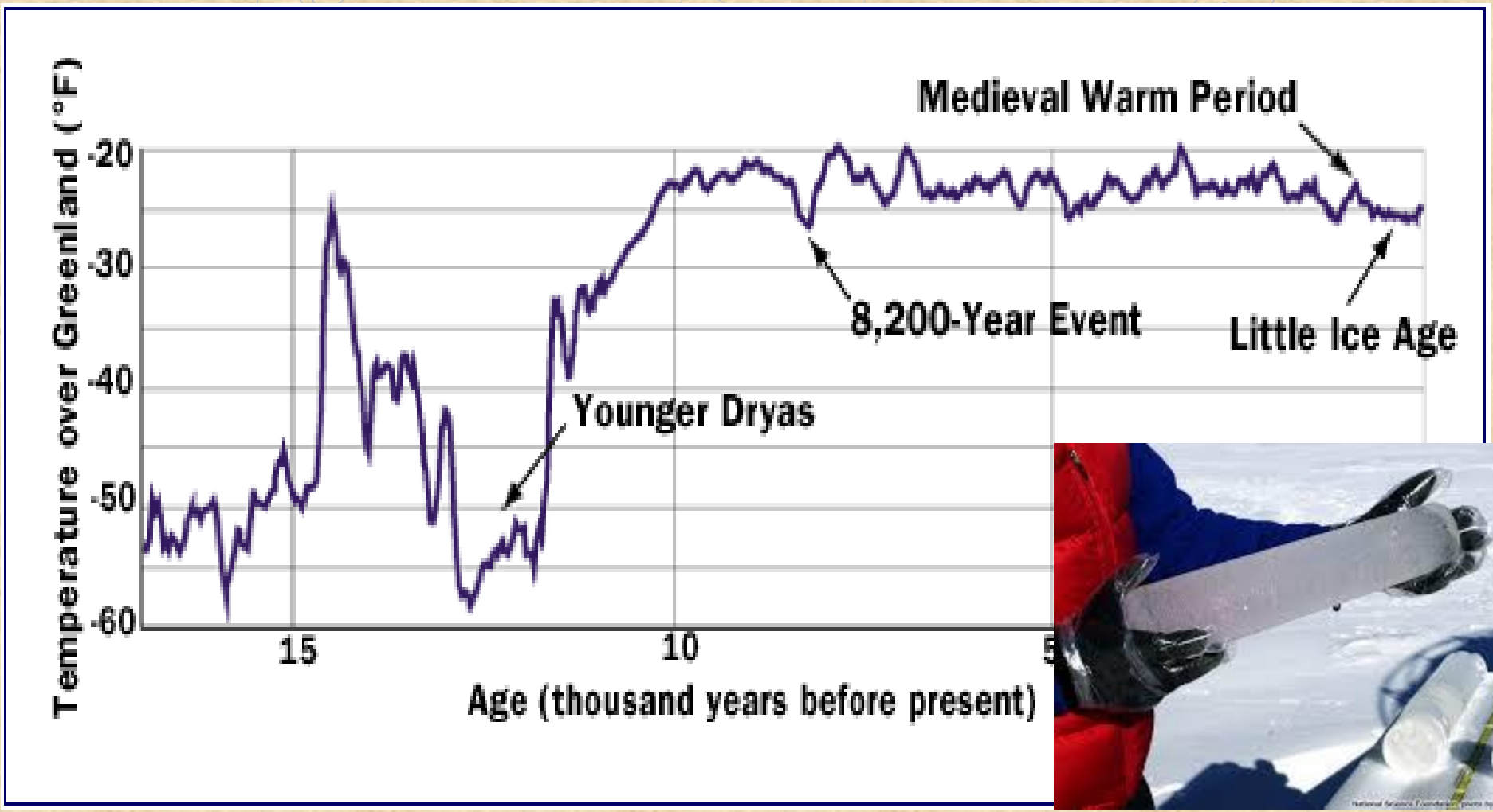
Abb. 2: Die Entwicklung der Sommertemperatur (Mai-September) der Nacheiszeit, abgeleitet aus Gletscher- und Waldgrenzschwankungen


ca. 7000 v. Chr.

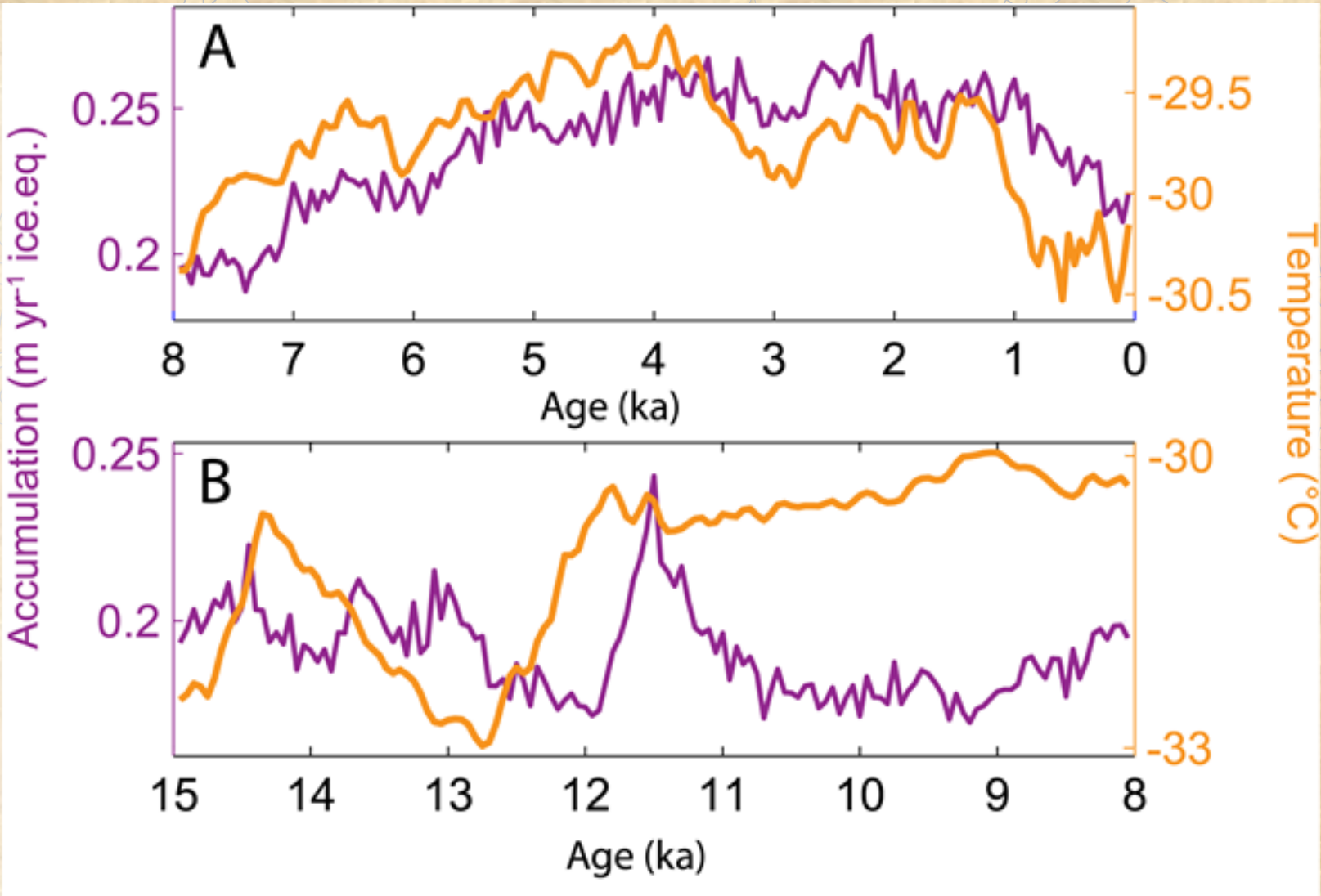

5370 - 5050 v. Chr.

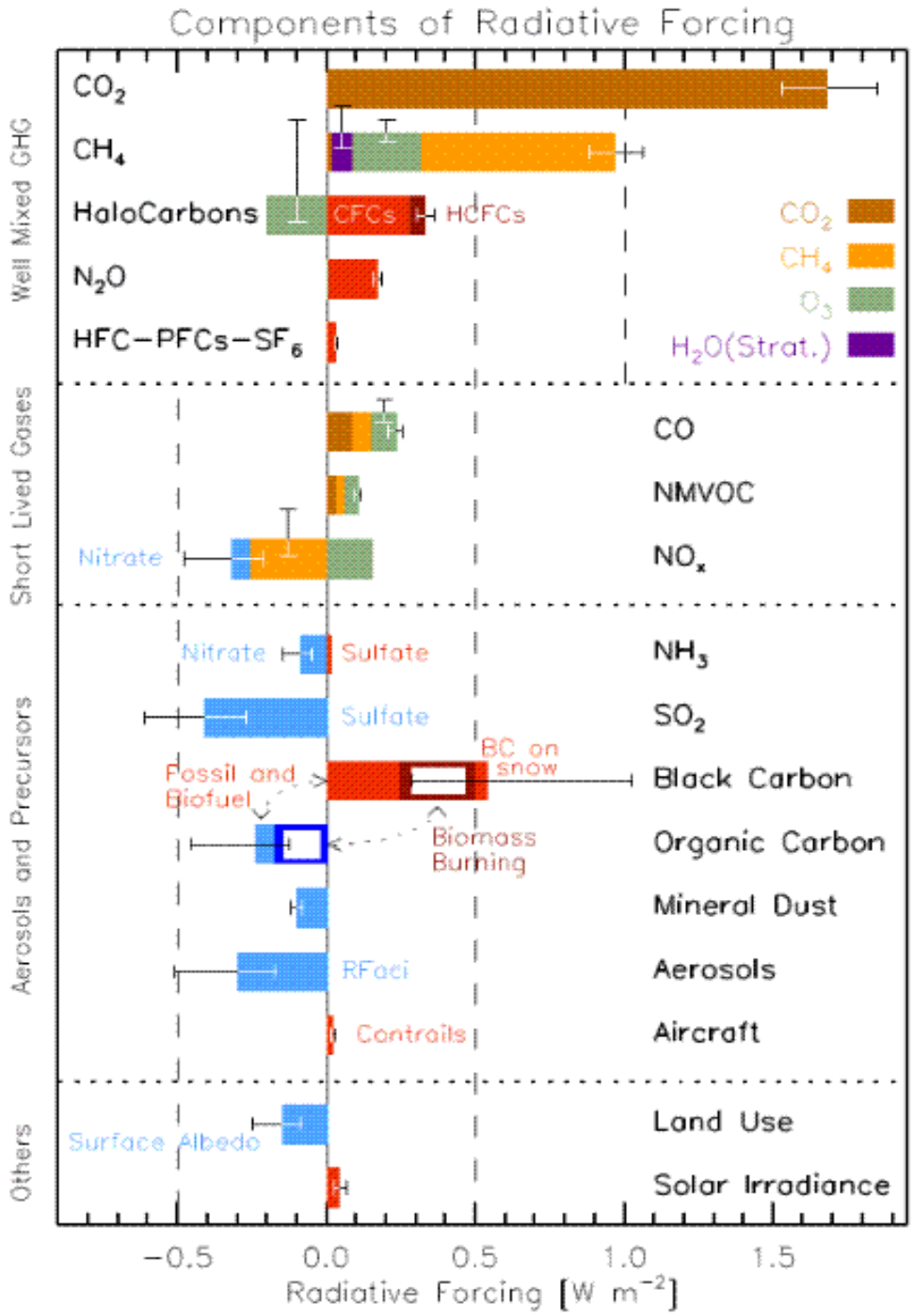
Temperatura en los Alpes según indicadores en estalagmitas, hasta 9000 años atrás

Temperaturas aéreas en Groenlandia (análisis de núcleos de hielo) desde el máximo de la última glaciación, hace 18.000 años (Alley, 2000)



En la Antártica occidental, las temperaturas han sido más altas que en la actualidad durante 8.000 años de los 10.000 años pasados (Fudge *et al.* 2016)

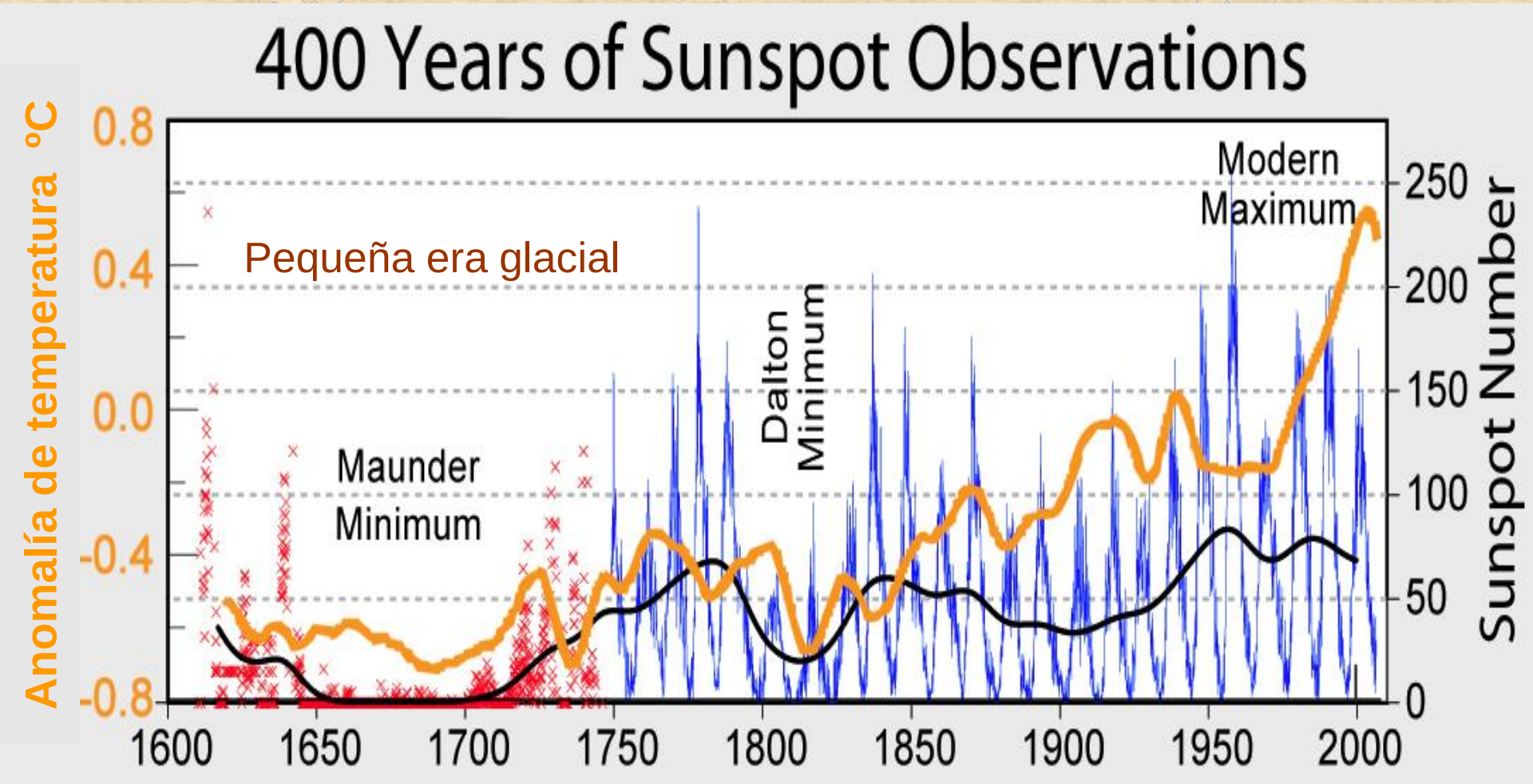




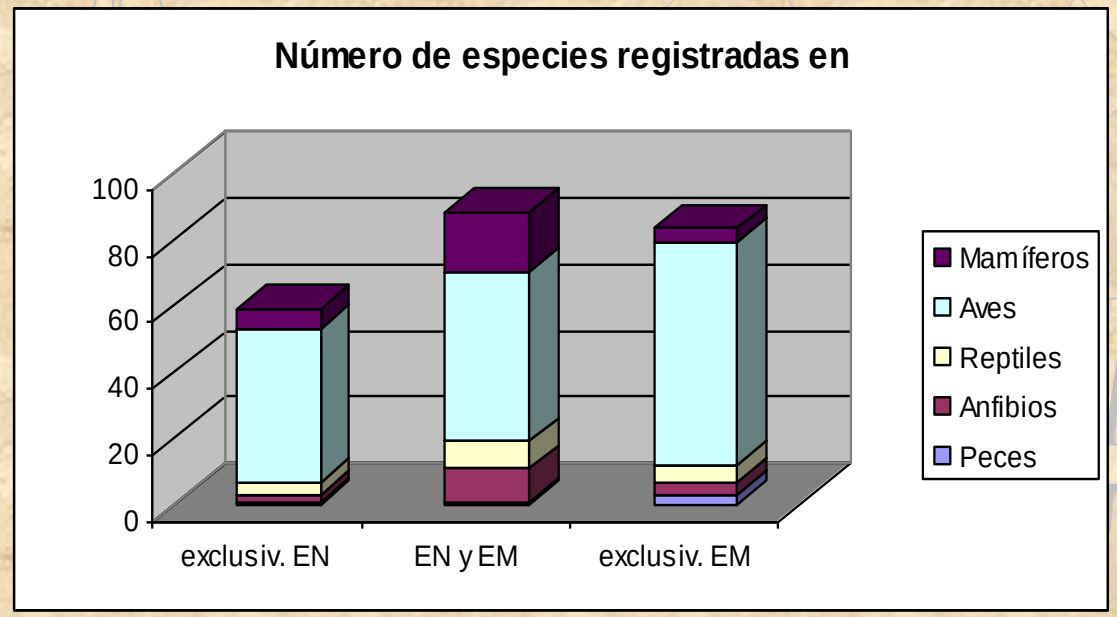
Componentes del forzamiento radiativo, que influyen en el calentamiento de la tierra

IPCC 2013, AR5

400 años de observación de actividad magnética solar
Pocas manchas solares en períodos fríos
(Ziegler 2013)



Ganadería y Biodiversidad



EN = Ecosistemas naturales
(Monte nativo y pastizales inundables)

EM = Ecosistemas modificados
(conjunto de pasturas con islas de monte, pasturas sin islas, corredores y bordes de monte, y tajamares)

Según Carlini et al. 1999












Uso programado de la tierra del Chaco (según POAT y leyes vigentes)

Pasturas cultivadas y agricultura	35%
Campos naturales (pastizales)	19%
Bosques (incl. cortinas, corredores e isletas)	45%
Otros	1%

El Chaco Paraguayo futuro
al momento de estar totalmente desarrollado
en el contexto global

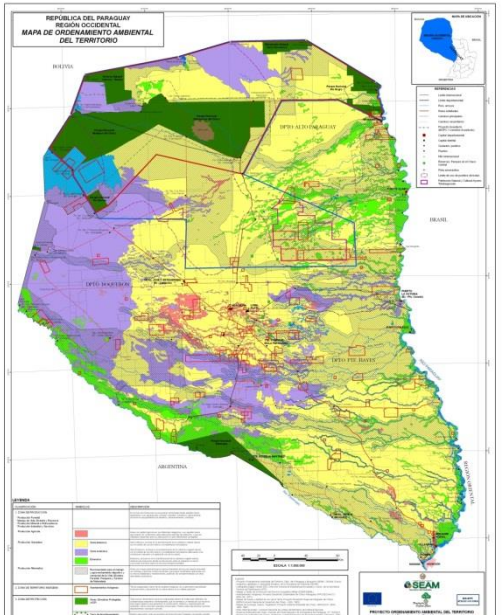
(Fuentes de datos: POAT, ARP 2012, FAO, SEAM, EMBRAPA)

	Chaco	Mundo
Vegetación boscosa	45%	29,5%
Bosques nativos entre todos bosques	≈ 75%	24 %
Áreas protegidas	≈ 10%	2,6 %

Con la suspensión inmediata del desarrollo del Chaco, Paraguay perdería:

- la habilitación de otras 4 mio. de has de pastura,
- un aumento del hato de ganado vacuno de 4 mio,
- la inversión de 2 mil millones de $$ canalizadas en empresas locales,
- faenas adicionales de 800 mil cabezas por año,
- un volumen anual de ventas de 500 mio de $$,
- ingresos anuales de divisas de 300 mio de $$
- la recaudación anual de impuestos de 50 mio $,
- > 30.000 oportunidades adicionales de empleo,
- mayor infraestructura en el Chaco.

Gandería sustentable en un Chaco ordenado



Glatzle *Pastoralism: Research, Policy and Practice* 2014, **4**:1
http://www.pastoralismjournal.com/content/4/1/1

Pastoralism
a SpringerOpen Journal

COMMENTARY **Open Access**

Questioning key conclusions of FAO publications 'Livestock's Long Shadow' (2006) appearing again in 'Tackling Climate Change Through Livestock' (2013)

Albrecht Glatzle

Tropical Grasslands – Forrajes Tropicales (2014) Volume 2, 60−62

Planet at risk from grazing animals?

ALBRECHT F. GLATZLE

Iniciativa para la Investigación y Transferencia de Tecnología Agr
www.inttas.org

Keywords: Climate change, global warming, methane, greenhouse

Journal of Environmental Science and Engineering B 2 (2014) 586-601
Formerly part of Journal of Environmental Science and Engineering, ISSN 1934-8932

DAVID PUBLISHING

Severe Methodological Deficiencies Associated with Claims of Domestic Livestock Driving Climate Change

Albrecht Glatzle

INTTAS (Initiative for Research and Extension of Sustainable Agrarian Technologies), Filadelfia 317, 9300 Fernheim, Paraguay

Received: March 04, 2013 / Accepted: March 17, 2014 / Published: April 20, 2014.